Access DB# _____

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Molly Ceperley Examiner #: 59757 Date: 04/18/03

Art Unit: 1641 Phone Number 308-4239 Serial Number: 09/923,760

Mail Box and Bldg/Room Location: CM1-8D15 Results Format Preferred (circle): PAPER DISK E-MAIL

↳ 7E12

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: _____ 1

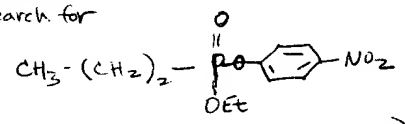
Inventors (please provide full names): _____ Bibliographic data sheet attached.

_____

Earliest Priority Filing Date: _____

***For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.**

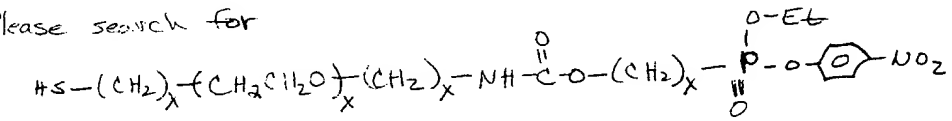
(1) Please search for



and cutinase

(nitrophenyl phosphonates)

(2) Please search for



X=1-12

(I'm trying to search a species of claims 36-39 (attached). Additional terms: protein chip, gold, immobilize?, capture polypeptide, fusion protein, alkanethiolate phosphonate, thiophene ester, polyethylene glycol.

Also see figure 13 attached.)

****

STAFF USE ONLY

Searcher: _____ POINT OF CONTACT: PAUL SCHULWITZ

Searcher Phone #: _____ TECHNICAL INFO. SPECIALIST

Searcher Location: _____ CM1 6B06 TEL. (703) 305-1954

Date Searcher Picked Up: 4/18

Date Completed: 4/18

Searcher Prep & Review Time: 10

Clerical Prep Time: _____

Online Time: 12

Type of Search	
NA Sequence (#)	_____
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Litigation	_____
Fulltext	_____
Patent Family	_____
Other	_____

Vendors and cost where applicable	
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Dialog	_____
Questel/Orbit	_____
Dr.Link	_____
Lexis/Nexis	_____
Sequence Systems	_____
WWW/Internet	_____
Other (specify)	_____

PTO-1590 (8-01)

Part 1


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Considered 05/27/03 MEC

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DEFAULT ECLEVEL IS LIMITED
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GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS   8

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L5            2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L3 AND (L4 OR CUTINAS?)


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L5   ANSWER 1 OF 2  HCAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:         2003:173839  HCAPLUS
DOCUMENT NUMBER:          138:217877
TITLE:                    Immobilization of biological molecules onto surfaces
                          coated with monolayers
INVENTOR(S):              Hodneland, Christian; Campbell, Stewart; Duffy, David;
                          Agosto, Melina; Wang, Evelyn
PATENT ASSIGNEE(S):       Surface Logix, Inc., USA
SOURCE:                   PCT Int. Appl., 234 pp.
                          CODEN: PIXXD2
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

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     WO 2003018854     A2    20030306      WO 2002-US27195  20020827
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             GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
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RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH,
CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR,
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PRIORITY APPLN. INFO.:
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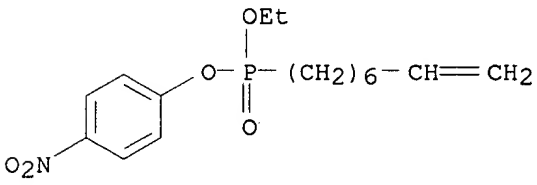
US 2002-356765P P 20020215
US 2002-358412P P 20020215
US 2002-357136P P 20020219
US 2002-375023P P 20020220
US 2002-380259P P 20020426

AB The present invention provides an article for immobilizing functional org. biomols. through a covalent bond to a thiolate monolayer on a coinage metal surface. Also provided are methods for making the article and methods for the immobilization of functional org. biomols. on the article. The thiolate monolayer contains two moieties, one having an inert group that is resistant to reacting with biomols. and one having a covalent bond forming group that reacts with the functional org. biomol. to covalently immobilize it on the monolayer.

IT **51377-41-4, Cutinase**
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(immobilization of biol. mols. onto surfaces coated with monolayers)
RN 51377-41-4 HCAPLUS
CN Cutinase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **496837-08-2P**
RL: ARU (Analytical role, unclassified); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation)
(immobilization of biol. mols. onto surfaces coated with monolayers)
RN 496837-08-2 HCAPLUS
CN Phosphonic acid, 7-octenyl-, ethyl 4-nitrophenyl ester (9CI) (CA INDEX NAME)



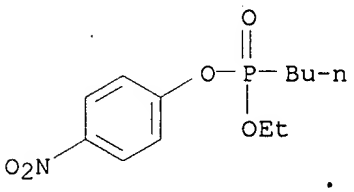
L5 ANSWER 2 OF 2 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2002:316564 HCAPLUS
DOCUMENT NUMBER: 137:43427
TITLE: Selective immobilization of proteins to self-assembled monolayers presenting active site-directed capture ligands
AUTHOR(S): Hodneland, Christian D.; Lee, Young-Sam; Min, Dal-Hee; Mrksich, Milan
CORPORATE SOURCE: Department of Chemistry, University of Chicago, Chicago, IL, 60637, USA
SOURCE: Proceedings of the National Academy of Sciences of the United States of America (2002), 99(8), 5048-5052

CODEN: PNASA6; ISSN: 0027-8424
PUBLISHER: National Academy of Sciences
DOCUMENT TYPE: Journal
LANGUAGE: English
OTHER SOURCE(S): CASREACT 137:43427

AB This paper describes a method for the selective and covalent immobilization of proteins to surfaces with control over the d. and orientation of the protein. The strategy is based on binding of the serine esterase **cutinase** to a self-assembled monolayer presenting a phosphonate ligand and the subsequent displacement reaction that covalently binds the ligand to the enzyme active site. Surface plasmon resonance (SPR) spectroscopy showed that **cutinase** binds irreversibly to a monolayer presenting the capture ligand at a d. of 1% mixed among tri(ethylene glycol) groups. The covalent immobilization is specific for **cutinase**, and the glycol-terminated monolayer effectively prevents unwanted nonspecific adsorption of proteins. To demonstrate that the method could be used to immobilize proteins of interest, a **cutinase**-calmodulin fusion protein was constructed and immobilized to the monolayer. SPR showed that calcineurin selectively assocd. with the immobilized calmodulin. This capture ligand immobilization method combines the advantages that the immobilization method combines the advantages that the immobilization reaction is highly selective for the intended protein, the tether is covalent and, hence, stable, and the method avoids the need for synthetic modification and rigorous purifn. of proteins before immobilization. These characteristics make the method well suited to a range of applications and, in particular, for constructing protein microarrays.

IT **3015-74-5 51377-41-4, Cutinase**
RL: BSU (Biological study, unclassified); PRP (Properties); BIOL (Biological study)
(selective immobilization of **cutinase** protein to self-assembled monolayers presenting active site-directed capture ligands)

RN 3015-74-5 HCAPLUS
CN Phosphonic acid, butyl-, ethyl 4-nitrophenyl ester (9CI) (CA INDEX NAME)



RN 51377-41-4 HCAPLUS
CN Cutinase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
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Part 2


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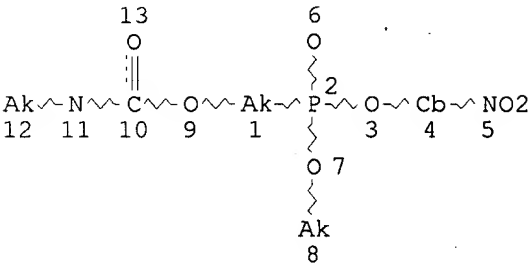

Considered 05/23/03 MEC

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L9   ANSWER 1 OF 3  HCAPLUS  COPYRIGHT 2003 ACS
ACCESSION NUMBER:        2002:316564  HCAPLUS
DOCUMENT NUMBER:         137:43427
TITLE:                   Selective immobilization of proteins to self-assembled
                         monolayers presenting active site-directed capture
                         ligands
AUTHOR(S):               Hodneland, Christian D.; Lee, Young-Sam; Min, Dal-Hee;
                         Mrksich, Milan
CORPORATE SOURCE:        Department of Chemistry, University of Chicago,
                         Chicago, IL, 60637, USA
SOURCE:                  Proceedings of the National Academy of Sciences of the
                         United States of America (2002), 99(8), 5048-5052
                         CODEN: PNASA6; ISSN: 0027-8424
PUBLISHER:               National Academy of Sciences
DOCUMENT TYPE:           Journal
LANGUAGE:                English
OTHER SOURCE(S):         CASREACT 137:43427
AB   This paper describes a method for the selective and covalent
     immobilization of proteins to surfaces with control over the d. and
     orientation of the protein.  The strategy is based on binding of the
     serine esterase cutinase to a self-assembled monolayer presenting a
     phosphonate ligand and the subsequent displacement reaction that
```

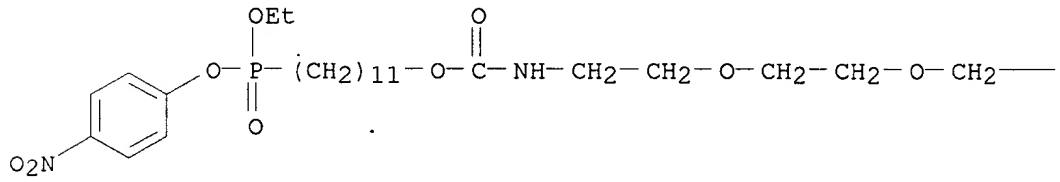
covalently binds the ligand to the enzyme active site. Surface plasmon resonance (SPR) spectroscopy showed that cutinase binds irreversibly to a monolayer presenting the capture ligand at a d. of 1% mixed among tri(ethylene glycol) groups. The covalent immobilization is specific for cutinase, and the glycol-terminated monolayer effectively prevents unwanted nonspecific adsorption of proteins. To demonstrate that the method could be used to immobilize proteins of interest, a cutinase-calmodulin fusion protein was constructed and immobilized to the monolayer. SPR showed that calcineurin selectively assocd. with the immobilized calmodulin. This capture ligand immobilization method combines the advantages that the immobilization method combines the advantages that the immobilization reaction is highly selective for the intended protein, the tether is covalent and, hence, stable, and the method avoids the need for synthetic modification and rigorous purifn. of proteins before immobilization. These characteristics make the method well suited to a range of applications and, in particular, for constructing protein microarrays.

IT **438619-39-7P**
RL: BUU (Biological use, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(selective immobilization of cutinase protein to self-assembled monolayers presenting active site-directed capture ligands)

RN 438619-39-7 HCAPLUS

CN 5,8,11,36,39,42-Hexaoxa-23,24-dithia-2-azatetratetracontanoic acid, 44-hydroxy-, 11-[ethoxy(4-nitrophenoxy)phosphinyl]undecyl ester (9CI) (CA INDEX NAME)

PAGE 1-A



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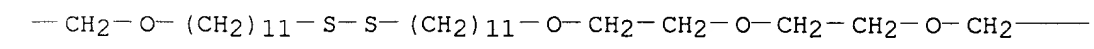

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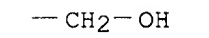

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L9 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:595532 HCAPLUS
DOCUMENT NUMBER: 133:346371
TITLE: Design and synthesis of triglyceride analogue biotinylated suicide inhibitors for directed molecular evolution of lipolytic enzymes
AUTHOR(S): Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V.
CORPORATE SOURCE: Protein Discovery, Novo Nordisk A/S, Bagsvaerd, 2880, Den.
SOURCE: Bioorganic & Medicinal Chemistry Letters (2000), 10(17), 2027-2031
CODEN: BMCLE8; ISSN: 0960-894X
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English
OTHER SOURCE(S): CASREACT 133:346371

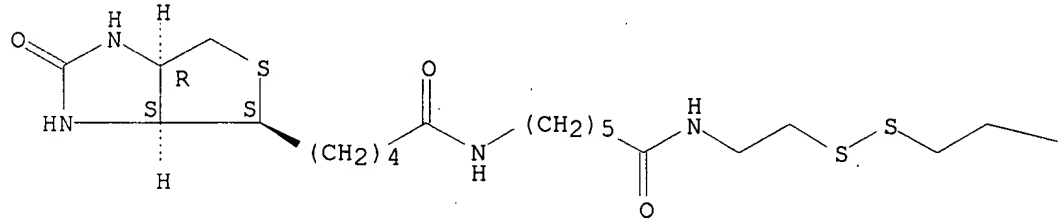
AB The design, synthesis, and inhibition properties of two new triglyceride analog biotinylated suicide inhibitors for directed mol. evolution of lipolytic enzymes by phage-display is described.

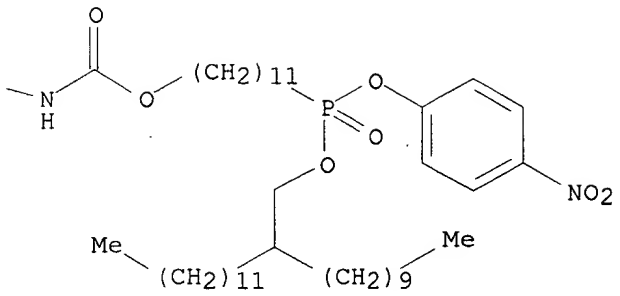
IT **305368-27-8P**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); RCT (Reactant); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); RACT (Reactant or reagent)
(design and synthesis of triglyceride analog biotinylated suicide inhibitors for directed mol. evolution of lipolytic enzymes)

RN 305368-27-8 HCAPLUS
CN 5,6-Dithia-2,9,16-triazaheneicosanoic acid, 21-[(3aS,4S,6aR)-hexahydro-2-oxo-1H-thieno[3,4-d]imidazol-4-yl]-10,17-dioxo-, 11-[[(2-decyltetradecyl)oxy](4-nitrophenoxy)phosphinyl]undecyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A





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L9 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2003 ACS
ACCESSION NUMBER: 2000:157038 HCAPLUS
DOCUMENT NUMBER: 132:331229
TITLE: A novel biotinylated suicide inhibitor for directed molecular evolution of lipolytic enzymes
AUTHOR(S): Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V.
CORPORATE SOURCE: Protein Discovery, Novo Nordisk A/S, Bagsvaerd, Den.
SOURCE: Bioorganic & Medicinal Chemistry (2000), 8(3), 507-513
CODEN: BMECEP; ISSN: 0968-0896
PUBLISHER: Elsevier Science Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

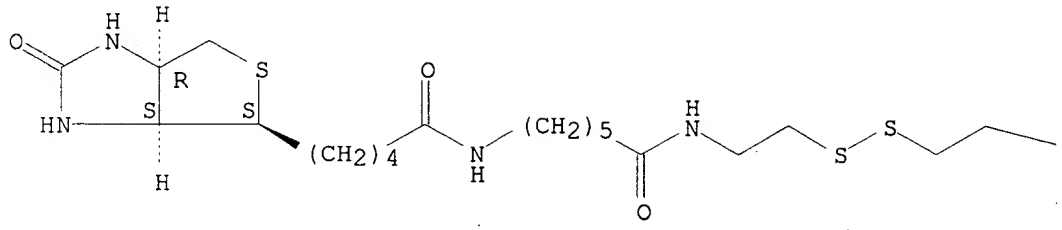
AB A bifunctional activity label for directed mol. evolution of lipolytic enzymes has been designed and synthesized. The structure is composed of a 4-nitrophenyl activated phosphonate connected to a biotin moiety through a disulfide bridge-contg. spacer. The phosphonate was prepd. by Michaelis-Arbuzov reaction of trimethylsilyl-protected 11-bromoundecanol with tri-Et phosphite. The deprotected .omega.-hydroxyalkylphosphonate was transformed into an active N-hydroxysuccinimide carbonate followed by 4-nitrophenyl activation of the phosphonate using std. procedures. The biotinylated phosphonate inhibitor was then synthesized by coupling the phosphonate inhibitor to a .epsilon.-amino-caproic acid-cystamine-contg. biotinyl spacer. The function of all relevant groups of the final activity label (biotin-label, cleavable disulfide bridge, phosphonate-inhibitor) have been successfully tested with the com. lipase Lipolase.RTM. (Novo Nordisk). Hence, a tool for directed mol. evolution of lipolytic enzymes has been developed.

IT **268227-44-7P**
RL: NUU (Other use, unclassified); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(cleavable-biotinylated suicide inhibitor; purifn. and characterization of cleavable biotinylated suicide inhibitor suitable for directed mol. evolution of lipolytic enzymes)

RN 268227-44-7 HCAPLUS
CN 5,6-Dithia-2,9,16-triazaheneicosanoic acid, 21-[(3aS,4S,6aR)-hexahydro-2-oxo-1H-thieno[3,4-d]imidazol-4-yl]-10,17-dioxo-, 11-[ethoxy(4-nitrophenoxy)phosphinyl]undecyl ester (9CI) (CA INDEX NAME)

Absolute stereochemistry.

PAGE 1-A



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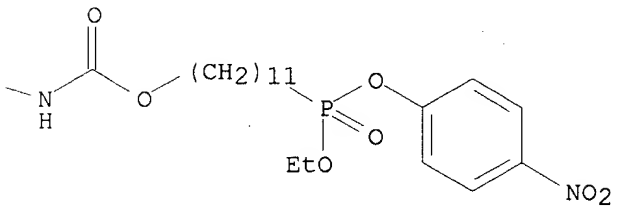

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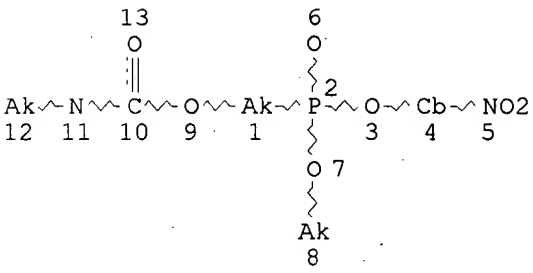


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GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS  13

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Considered 05/23/03 MEC

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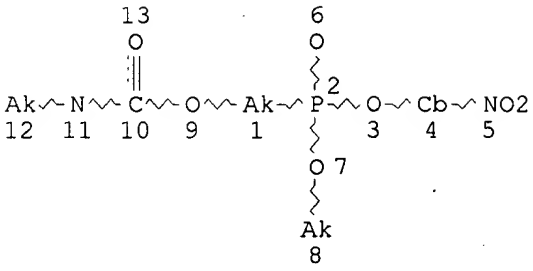


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GRAPH ATTRIBUTES:
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NUMBER OF NODES IS  13

STEREO ATTRIBUTES: NONE
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L12  ANSWER 1 OF 2 BEILSTEIN COPYRIGHT 2003 BEILSTEIN CDS MDL

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                                     lfanyl>ethylamino)carbonyl>oxyundecyl)
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                                     ester
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     Compound Type (CTYPE):          heterocyclic
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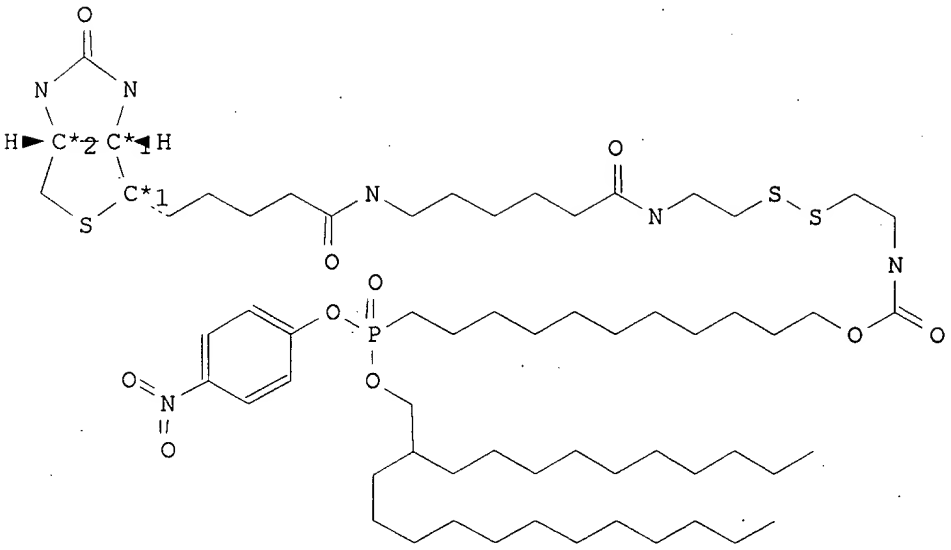
Entry Date (DED): 2001/04/26
Update Date (DUPD): 2001/04/26



Atom/Bond Notes:
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ED	Entry Date	1
UPD	Update Date	1
NMR	Nuclear Magnetic Resonance	1
PHARM	Pharmacological Data	1

This substance also occurs in Reaction Documents:

Code	Name	Occurrence
RX	Reaction Documents	1

RXPRO Substance is Reaction Product 1

Nuclear Magnetic Resonance:
NMR

Description (.KW):	Chemical shifts
Nucleus (.NUC):	1H
Solvents (.SOL):	CDCl3
Frequency (.F):	400 MHz

Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem.Lett., CODEN: BMCLE8, 10(17), <2000>, 2027 - 2032; BABS-6267564

L12 ANSWER 2 OF 2 BEILSTEIN COPYRIGHT 2003 BEILSTEIN CDS MDL

Beilstein Records (BRN):	8534896
Chemical Name (CN):	ethyl (4-nitrophenyl)(11-<(2-<(2-<6-(5-<(3aR,4R,6aS)-2-oxoperhydrothieno<3,4-d>imidazol-4-yl>pentanoylamino)hexanoyl>aminoethyl)disulfanyl>ethylamino)carbonyl>oxyundecyl)phosphonate
Autonom Name (AUN):	<11-<2-(2-<6-<5-(2-oxo-hexahydro-thieno<3,4-d>imidazol-6-yl)-pentanoylamino>-hexanoylamino>-ethyldisulfanyl)-ethylcarbamoyloxy>-undecyl>-phosphonic acid ethyl ester 4-nitro-phenyl ester
Molec. Formula (MF):	C40 H67 N6 O10 P S3
Molecular Weight (MW):	919.16
Lawson Number (LN):	32212, 5220, 3763, 3415, 3125, 1762, 298
File Segment (FS):	Stereo compound
Compound Type (CTYPE):	heterocyclic
Constitution ID (CONSID):	7235624
Tautomer ID (TAUTID):	8037747
Entry Date (DED):	2000/07/18
Update Date (DUPD):	2000/07/18

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *
Atom/Bond Notes:
1. CIP Descriptor: S
2. CIP Descriptor: R

Field Availability:

Code	Name	Occurrence
BRN	Beilstein Records	1
CN	Chemical Name	1
AUN	Autonomname	1
MF	Molecular Formula	1
FW	Formular Weight	1
LN	Lawson Number	7

FS	File Segment	1
CTYPE	Compound Type	1
CONSID	Constitution ID	1
TAUTID	Tautomer ID	1
ED	Entry Date	1
UPD	Update Date	1
MP	Melting Point	1
NMR	Nuclear Magnetic Resonance	5
PHARM	Pharmacological Data	1

This substance also occurs in Reaction Documents:

Code	Name	Occurrence
RX	Reaction Documents	1
RXPRO	Substance is Reaction Product	1

Melting Point:

Value (MP) (Cel)	Ref.
127 - 132	1

Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908

Nuclear Magnetic Resonance:

NMR
Coupling Nuclei (.NUI) 1H-1H,31P-1H
Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908

NMR
Coupling Nuclei (.NUI) 31P-13C
Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908

NMR
Description (.KW): Chemical shifts
Nucleus (.NUC): 31P
Solvents (.SOL): CDCl3
Frequency (.F): 162 MHz
Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908

NMR
Description (.KW): Chemical shifts
Nucleus (.NUC): 1H
Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908

NMR

Description (.KW): Chemical shifts
Nucleus (.NUC): 13C
Reference(s):
1. Deussen, H.-J.; Danielsen, S.; Breinholt, J.; Borchert, T. V., Bioorg.Med.Chem., CODEN: BMECEP, 8(3), <2000>, 507 - 514; BABS-6222908